Diabetes Update

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Section #1 OBJECTIVE

BE ABLE TO DIFFERENTIATE TYPE 1 FROM TYPE 2 DIABETES

Clinical features:

- age at onset
- body weight/bmi
- family history
- treatment history
- hx of dka

Lab features to consider:

- Insulin level
- C-peptide level
- Islet antibodies
- GAD antibodies
- Anti- insulin antibodies

Typical features of Type 1 diabetes

- Age <4-
- Body weight at or near IBW at diagnosis
- Sparse family history of diabetes
- + serologies
- Low c-peptide/insulin levels

Typical features of type 2 diabetes

- Age >40
- Overweight
- Strongly positive family history
- Increased c-peptide/insulin level
- Negative serologies

Typical Features of LADA

- Age +/- 40
- Weight- can be low, normal or high
- Family history: tends to be sparse
- C-peptide/insulin level may be normal
- Serologies are +
- Often will have been on OADs for a year or 2

Case #1
- 52 yo wf
- Diagnosed type 2 age 48
- Treated with a variety of oral agents
- No family with diabetes
- Bmi 17
- A1c >11.
- Symptoms: wt loss and fatigue

Case #1 (cont)

- Started her on basal insulin and stopped oad
- Ordered labs: gad, ica and c-peptide
- Gada ++++, C-peptide 1.0, ICA negative

- What does she have?
- How would you treat her ?

Case #2

-35 yo wm admitted to hospital with DKA and Sepsis due to a scrotal abscess
-treated in icu with iv insulin
- Sent home on basal/bolus insulin
- Bmi 42
- Father has type 2 diabetes.

Case #2 (cont)

- 2 weeks later, seen in office.
- Smbg readings all normal on insulin.
- Labs showed: negative GADA and ICA
- C-peptide = 5.7

- What does he have ?

Case #2 (continued)

Treatment- stayed on insulin for 2 months.
Transitioned to oad's which he stayed on for 6 months
Now, 5 years later, he is on no meds for diabetes
And his a1c =4.8.

Case #3

- 40 yo wm admitted in DKA
- No infection
- Bmi= 48
- No family history of diabetes
- Treated in icu with iv insulin
- Sent home on basal/ bolus insulin.
- What does he have?

Case #3 (cont)

Labs: GADA ++++, ICA ++++, C-peptide = 1.7

Treatment: enrolled in research study for newly Diagnosed type 1 diabetics. Now on <10 units of Insulin /day with a1c <6.0

Take home points:

-1- not all newly diagnosed adults with diabetes are type 2

-2- not all patients with DKA are type 1 diabetics

-3- until you are sure what they have, it is safer to use insulin

Section #2

Treating the blood sugar in type 2 diabetics

Objectives:
- understand the biochemical defects
- Understand the mechanism of action for the
- Different classes of meds
- Identify goals and treatment strategies.

BIOCHEMICAL DEFECTS

Insulin Resistance- liver, fat, muscle cells

Insulin deficiency- fasting
- post prandial

Glucagon excess- post prandial

Appetite dysregulation

Excessive renal reabsorption of glucose

Insulin resistance

liver- biguanide (metformin)
Fat and Muscles- TZD's

Insulin deficiency

-fasting- SU. Insulin. GLP1-RA
-post prandial- glinides, dpp4, glp1ra, insulin.

Glucagon Excess

- Post prandial- DPP4/ GLP1ra

Appetite Dysregulation

- GLP1RA

Renal reabsorption of glucose

- SGLT 2 inhibitors.

List of meds in each category

Biguanides: metformin

Tzds: pioglitazone

Sulfonylureas: glipizide, glyburide, glimepiride

Glinides: nataglinide

List of meds (continued)

Insulins: long acting: levemir, lantus, toujeo basaglar, tresiba.
Intermediate acting: NPH. U500 R
Short acting : REGULAR
Mixed: 70/30, 50/50, 75/25
Fast acting : apidra, novolog, humalog

List of meds:

DPP4 inhibitors: Januvia, onglyza, tradjenta, nesina
GLP1 RA: Byetta, Bydureon, Victoza, Trulicity Tanzeum
SGLT2 inhibitors: Jardiance, Farxiga and Invokana

Side effects

- Biguanides: gastrointestinal
- TZDs: wt gain, edema, chf
- SFU/Glinides: wt gain, hypos
- Insulin:wt gain, hypos
- Dpp4i: musculoskeletal pain, pancreatitis, ?chf
- GLP1: pancreatitis, MTC. GI side effects.
- SGLT2: UTI, GMI, volume depletion

Beneficial effects

- Weight loss, no hypos. ? c/v benefit
- No hypos.
- Cheap
- Effectiveness
- No hypos. Weight neutral
- Wt loss, no hypos. C/V benefit*
- C/V benefit*, wt loss, no hypos

With all of the options, how do we choose which medications to use ?

We let the guidelines help us !

The AACE and ADA guidelines are slightly different.
Pick one and try to be consistent

I keep a copy of the AACE guidelines on my desk.

Case # 1.
45 yo wm comes to the doc for routine physical
FBG = 176. A1c= 7.4, BMI 42. Strong family history of diabetes.

- Sent for dietary education
- Advised about exercise
- Started on metformin.
- 3 months later. Down 6 pounds and a1c =6.8

The story continues---

Patient returns 6 months later. A1c 7.2
Was advised to be more attentive to diet and exercise
Does not follow up for a year then and sees a different Provider. A1c 7.6. Blamed high blood sugar on stress.
No med changes. Insurance changed and patient could Not follow up in that clinic. Returns 5 years later
On no meds for diabetes and a1c >8.5. So a1c now >7
For almost 7 years.

pt was put on metformin + GLP1.
3 months later a1c 7.2.. SGLT2 was added
3 months later a1c. 6.4..
1 year later.. Now a1c still 6.4

What does this case tell us?

Case #2

50 yo woman calls to come in because of wt loss
Polyuria, polydipsia and fatigue.
A1c 11. random bg 358.
BMI 42. + family hx. EGFr- 120.
How would you start her treatment?

I chose to put her on metformin + basal insulin
And referred for diabetes education.

1 month later, symptoms abated and fsbs were
In the 90-130 range fasting .
She had gained 11 pounds.

I switched insulin to a glp1. 3 months later
A1c is 6.7 and she is down 15 pounds.

Care is ongoing because diabetes is relentless.